The claims defining the invention are as follows:

1. A method of entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, said method including the steps of:

pre-analyzing transform coefficients of a code block in sign-magnitude form;

storing statistical data about said coefficients; and

based upon said statistical data, generating at least one command for at least one sequence of bit and context pairs for arithmetic encoding.

2. The method according to claim 1, wherein said statistical data is stored with said coefficients.

3. The method according to claim 1, further including the step of buffering significance state data, coded data, magnitude refinement data, bit data, and sign data for said code block.

4. The method according to claim 3, wherein said buffering step is implemented using register arrays for context generation.

5. The method according to claim 4, further including the step of switching to a specific region of said code block in any one of significance propagation, magnitude refinement, and cleanup coding passes.

6. The method according to claim 5, wherein said switching step is implemented using rotate-left and rotate-up operations of said register arrays.

7. The method according to claim 1, further including the step of buffering bit and context data before arithmetic coding using said bit and context data.

8. The method according to claim 7, wherein bit, context and the number of a bit and context pairs are buffered.

9. The method according to claim 8, wherein said buffering step is implemented using a FIFO.

10. The method according to claim 1, further including the steps of:

buffering a region of a code block, said region being currently coded; and

buffering separately the remaining regions of said code block.

11. The method according to claim 10, wherein:

said buffering step for said region currently being coded is implemented using a register window; and

said buffering step for said remaining regions is implemented using a scratch memory.

12. The method according to claim 1, further including the steps of:

looking for, using a bypass control module, the next region of a code block to be coded in each of significance propagation, magnitude refinement, and cleanup coding passes; and

generating, using a context generation module, a context of a region previously provided by said bypass control module, said bypass control and context generations modules operating in parallel.

13. The method according to claim 12, further including the step of communicating data between said bypass control and context generation modules using a bus, said bus including a control bus and a data bus, said control bus providing an indication of which column to start in a region when said context generation module processes said region.

14. The method according to claim 13, further including the step of detecting termination of processing in said context generation module for each pass, said detected termination enabling coding in said region to be terminated before scanning to a last column.

15. The method according to claim 1, wherein said entropy coding is JPEG 2000 entropy coding.

16. An apparatus for entropy coding of discrete wavelet transform coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, said apparatus including:

means for pre-analyzing transform coefficients of a code block in sign-magnitude form;

means for storing statistical data about said coefficients; and

means for, based upon said statistical data, generating at least one command for at least one sequence of bit and context pairs for arithmetic encoding.

17. The apparatus according to claim 16, wherein said statistical data is stored with said coefficients.

18. The apparatus according to claim 16, further including means for buffering significance state data, coded data, magnitude refinement data, bit data, and sign data for said code block.

19. The apparatus according to claim 18, wherein said buffering means is register arrays for context generation.

20. The apparatus according to claim 19, further including means for switching to a specific region of said code block in any one of significance propagation, magnitude refinement, and cleanup coding passes.

21. The apparatus according to claim 20, wherein said switching means implements rotate-left and rotate-up operations of said register arrays.

22. The apparatus according to claim 16, further including means for buffering bit and context data before arithmetic coding using said bit and context data.

23. The apparatus according to claim 22, wherein bit, context and the number of a bit and context pairs are buffered.

24. The apparatus according to claim 23, wherein said buffering means is a FIFO.

25. The apparatus according to claim 16, further including:

means for buffering a region of a code block, said region being currently coded; and

means for buffering separately the remaining regions of said code block.

26. The apparatus according to claim 25, wherein:

said buffering means for said region currently being coded is a register window; and

said buffering means for said remaining regions is implemented using a scratch memory.

27. The apparatus according to claim 16, further including:

a bypass control module for looking for the next region of a code block to be coded in each of significance propagation, magnitude refinement, and cleanup coding passes; and

context generation module for generating a context of a region previously provided by said bypass control module, said bypass control and context generations modules operating in parallel.

28. The apparatus according to claim 27, further including a bus for communicating data between said bypass control and context generation modules, said bus including a control bus and a data bus, said control bus providing an indication of which column to start in a region when said context generation module processes said region.

29. The apparatus according to claim 28, further including means for detecting termination of processing in said context generation module for each pass, said detected termination enabling coding in said region to be terminated before scanning to a last column.

30. The apparatus according to claim 16, wherein said entropy coding is JPEG 2000 entropy coding.

31. A computer program product having a computer readable medium having a computer program recorded therein for entropy coding of discrete wavelet transform

(DWT) coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, said computer program product including:

computer program code means for pre-analyzing transform coefficients of a code block in sign-magnitude form;

computer program code means for storing statistical data about said coefficients; and

computer program code means for, based upon said statistical data, generating at least one command for at least one sequence of bit and context pairs for arithmetic encoding.

32. The computer program product according to claim 31, wherein said statistical data is stored with said coefficients.

33. The computer program product according to claim 31, further including computer program code means for buffering significance state data, coded data, magnitude refinement data, bit data, and sign data for said code block.

34. The computer program product according to claim 33, wherein said buffering computer program code means implements register arrays for context generation.

35. The computer program product according to claim 34, further including computer program code means for switching to a specific region of said code block in any one of significance propagation, magnitude refinement, and cleanup coding passes.

36. The computer program product according to claim 35, wherein said computer program code means for switching implements rotate-left and rotate-up operations of said register arrays.

37. The computer program product according to claim 31, further including computer program code means for buffering bit and context data before arithmetic coding using said bit and context data.

38. The computer program product according to claim 37, wherein bit, context and the number of a bit and context pairs are buffered.

39. The computer program product according to claim 38, wherein said buffering computer program code means implements a FIFO.

40. The computer program product according to claim 31, further including:

computer program code means for buffering a region of a code block, said region being currently coded; and

computer program code means for buffering separately the remaining regions of said code block.

41. The computer program product according to claim 40, wherein:

said computer program code means for buffering said region currently being coded is a register window; and

said buffering means for said remaining regions is a scratch memory.

42. The computer program product according to claim 31, further including:

computer program code means for implementing a bypass control module to look for the next region of a code block to be coded in each of significance propagation, magnitude refinement, and cleanup coding passes; and

computer program code means for context generation module to generate a context of a region previously provided by said bypass control module, said bypass control and context generations modules operating in parallel.

43. The computer program product according to claim 42, further including a bus for communicating data between said bypass control and context generation modules, said bus including a control bus and a data bus, said control bus providing an indication of which column to start in a region when said context generation module processes said region.

44. The computer program product according to claim 43, further including computer program code means for detecting termination of processing in said context generation module for each pass, said detected termination enabling coding in said region to be terminated before scanning to a last column.

45. The computer program product according to claim 31, wherein said entropy coding is JPEG 2000 entropy coding.

46. An apparatus for entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged into code blocks and coded in bitplane order using three coding passes for each bitplane, said apparatus including:

a context generator for generating a context for each bit of one or more coefficients in a code block;

an arithmetic coder for entropy coding each bit to be coded from said code block using said context for said bit; and

a FIFO coupled between said context generator and said arithmetic coder for streamlining transfer of data between said context generator and said arithmetic coder, said FIFO adapted to store each bit, said corresponding context and a repeat number of said bit and context pair.

47. The apparatus according to claim 46, wherein said context generator includes means for generating a repeat pattern of two or more bit and context pairs in a single clock cycle.

48. The apparatus according to claim 47, wherein a run length repeat command represents said repeat pattern.

49. The apparatus according to claim 48, wherein said FIFO stores said run length repeat command as said repeat number.

50. The apparatus according to claim 46, wherein said context generator provides context at variable rates.

51. The apparatus according to claim 46, wherein said arithmetic coder includes means for accelerating coding of a codestream using said repeat pattern.

52. The apparatus according to claim 51, wherein said arithmetic coder further includes means for calculating a repeat count r for two or more bits dependent upon an

interval A and a current estimate of LPS probability Qe(I(CX)), where I(CX) is an index stored for a context CX.

53. The apparatus according to claim 52, wherein said arithmetic coder further includes:

means for entropy encoding said two or more bits in a Run Length context using one of said repeat count r and said repeat number dependent upon whether said repeat count r is greater than said repeat number.

54. The apparatus according to claim 46, wherein said FIFO effects a speedup in processing of a first cleanup pass involving run length coding.

55. The apparatus according to claim 46, wherein said entropy coding is JPEG 2000 entropy coding.

56. A method of entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged into code blocks and coded in bitplane order using three coding passes for each bitplane, said method including the steps of:

generating a context for each bit of one or more coefficients in a code block;

arithmetic coding each bit to be coded from said code block using said context for said bit; and

buffering using a FIFO to streamline transfer of data between said context generating step and said arithmetic coding step, said FIFO adapted to store each bit, said corresponding context and a repeat number of said bit and context pair.

57. The method according to claim 56, wherein said context generating step includes the step of generating a repeat pattern of two or more bit and context pairs in a single clock cycle.

58. The method according to claim 57, wherein a run length repeat command represents said repeat pattern.

59. The method according to claim 58, wherein said FIFO stores said run length repeat command as said repeat number.

60. The method according to claim 56, wherein said context generating step provides context at variable rates.

61. The method according to claim 56, wherein said arithmetic coding step includes accelerating coding of a codestream using said repeat pattern.

62. The method according to claim 61, wherein said arithmetic coding step further includes the step of calculating a repeat count r for two or more bits dependent upon an interval A and a current estimate of LPS probability Qe(I(CX)), where I(CX) is an index stored for a context CX.

63. The method according to claim 62, wherein said arithmetic coding step further includes the step of entropy encoding said two or more bits in a Run Length context using one of said repeat count r and said repeat number dependent upon whether said repeat count r is greater than said repeat number.

64. The method according to claim 56, wherein said FIFO effects a speedup in processing of a first cleanup pass involving run length coding.

65. The method accirding to claim 56, wherein said entropy coding is JPEG 2000 entropy coding.

66. A computer program product having a computer readable medium having a computer program recorded therein for entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged into code blocks and coded in bitplane order using three coding passes for each bitplane, said computer program product including:

computer program code means for generating a context for each bit of one or more coefficients in a code block;

computer program code means for arithmetic coding each bit to be coded from said code block using said context for said bit; and

computer program code means for providing a FIFO between said context generating and said arithmetic coding to streamline transfer of data between said context

generator and said arithmetic coder, said FIFO adapted to store each bit, said corresponding context and a repeat number of said bit and context pair.

67. The computer program product according to claim 66, wherein said computer program code means for context generating includes computer program code means for generating a repeat pattern of two or more bit and context pairs in a single clock cycle.

68. The computer program product according to claim 67, wherein a run length repeat command represents said repeat pattern.

69. The computer program product according to claim 68, wherein said FIFO stores said run length repeat command as said repeat number.

70. The computer program product according to claim 66, wherein said computer program code means for context generating provides context at variable rates.

71. The computer program product according to claim 66, wherein said computer program code means for arithmetic coding includes computer program code means for accelerating coding of a codestream using said repeat pattern.

72. The computer program product according to claim 71, wherein said computer program code means for arithmetic coding further includes computer program code means for calculating a repeat count r for two or more bits dependent upon an interval A and a current estimate of LPS probability Qe(I(CX)), where I(CX) is an index stored for a context CX.

73. The computer program product according to claim 72, wherein said computer program code means for arithmetic coding further includes:

computer program code means for entropy encoding said two or more bits in a Run Length context using one of said repeat count r and said repeat number dependent upon whether said repeat count r is greater than said repeat number.

74. The computer program product according to claim 66, wherein said entropy coding is JPEG 2000 entropy coding.

75. An apparatus for entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, substantially as hereinbefore described with reference to Figs. 1-28 of the accompanying drawings.

76. A method of entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, substantially as hereinbefore described with reference to Figs. 1-28 of the accompanying drawings.

77. A computer program product having a computer readable medium having a computer program recorded therein for entropy coding of discrete wavelet transform (DWT) coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane, substantially as hereinbefore described with reference to Figs. 1-28 of the accompanying drawings.